DOCUMENT RESUME

ED 131 741 HE 008 312

AUTHOR Troutman, James G.
TITLE The Use of a Mathematical Model to Assist in Formulating an Institutional Tenure Policy.
PUB DATE Nov 76
NOTE 53p.; Ed.D. Practicum, Nova University

EDRS PRICE MF-$0.83 HC-$3.50 Plus Postage.
DESCRIPTORS *College Faculty; Employment Qualifications; *Higher Education; *Instructional Staff; *Mathematical Models; Models; Policy Formation; Probationary Period; Statistical Data; *Teacher Employment; Teacher Retirement; *Tenure
IDENTIFIERS *York College

ABSTRACT

Since 1972 the national percentage of tenured faculty has risen from 43 to 60 percent, and from 23 to 52 percent at York College of Pennsylvania. The tenure policy has been debated there and nationally, and the college has changed its policy almost annually. This study first established an analytic faculty profile to determine the parameters for a mathematical model for projecting the future percent of faculty on tenure. Using the parameters for York College established that the tenure rate would rise from 52.4 percent in 1976 to 73.4 percent in 1986. Each of the parameters are discussed as they affect the outcome of the model. The growth rate of the faculty, the growth rate of the tenured faculty, and the percent of tenured faculty were considered, along with a discussion of the factors necessary to maintain an established tenure ratio. Recommendations are made regarding: more effective staff planning procedures; more careful appointment procedures; use of the maximum probationary period; more careful tenure evaluation; examination of an early retirement policy; and the elimination of the present departmental quota policy. (Author/LBH)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED131741

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ABSTRACT

Troutman, James G. The Use of a Mathematical Model to Assist in Formulating an Institutional Tenure Policy. Research practicum presented to Nova University in partial fulfillment of the requirements for the degree of Doctor of Education, November, 1976.

Since 1972 the national percentage of tenured faculty has risen from 43 percent to 60 percent. It has risen from 23 percent to 52 percent at York College of Pennsylvania during this same period. The tenure policy has been debated over the past five years at York College as well as nationally. The College has changed its policy almost annually without achieving a practice that is acceptable to both the administration and the faculty.

The study first established an analytic faculty profile. This profile was used to determine the parameters for a mathematical model designed to project the future percent of faculty on tenure. Using the parameters for York College established that the tenure rate would rise from 52.4 percent in 1976 to 73.4 percent in 1986.

HE008 312

The study then discussed each of the parameters as they effect the outcome of the model. The growth rate of the faculty, the growth rate of the tenured faculty and the percent of tenured faculty were considered in turn. There was also a discussion of the factors necessary to maintain an established tenure ratio.

The recommendations that were made concern the following: A more effective staff planning procedure. A more careful appointment procedure. Use of the maximum probationary period. A more careful tenure evaluation. The examination of an early retirement policy. And the elimination of the present departmental quota policy.

THE USE OF A MATHEMATICAL MODEL TO ASSIST IN FORMULATING AN INSTITUTIONAL TENURE POLICY

THE
EDUCATIONAL POLICY
SYSTEMS

by

James G. Troutman, M.A.

York College of Pennsylvania

DR. KENNETH MILLER

EASTERN PENNSYLVANIA

A PRACTICUM PRESENTED TO NOVA UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF EDUCATION

NOVA UNIVERSITY

November 1976

TABLE OF CONTENTS

	Page
PRACTICUM EVALUATION FORM	ii
LIST OF TABLES	vii
LIST OF FIGURES	viii
INTRODUCTION	1
The Problem	1
The Investigation	2
BACKGROUND AND SIGNIFICANCE	2
National Tenure Trends	2
Tenure	3
Quotas	4
Tenure at York College	5
Method	5
Policy	6
PROCEDURES	14
Collection of Background Information	14
Formulation of the Model	15
Limitations and Assumptions	19
RESULTS	21

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS 22

Effects of G(n) 24

Effects of N(n) 27

Maintaining a Ratio 29

Recommendations 30

Staff Planning 30

New Positions 33

Probationary Period 34

Tenure Evaluation 35

Retirement 35

Conclusion 36

Potential for Improvement 39

Internal Relations 39

Policy 39

BIBLIOGRAPHY 41

APPENDIXES

Practicum Proposal Approval 45

Peer Reader Form 46

LIST OF TABLES

Table		Page
1.	Tenure Profile	15
2.	Model Parameters 1968-1976 Basis	21
3.	Projected Tenure Percent	22
4.	Model Parameters 1971-1976 Basis	23
5.	Projected Tenure Percent	23
6.	Nontenured Replacements Verses Annual Promotion to Tenure	33

LIST OF FIGURES

Figure		Page
1.	Faculty Tenure Flow Chart	20
2.	Tenure Percentages at York College of Pennsylvania	22
3.	Tenure Percent N(n) = 0	25
4.	Tenure Percent N(n) = 0.1	26
5.	Tenure Percent G(n) = 0	28
6.	Tenure Percent G(n) = 0.1	29

INTRODUCTION

The purpose of this paper was to examine the tenure situation at York College of Pennsylvania. From this examination a mathematical model was formulated and used to project the tenure situation during the next decade. It was expected that this paper would aid in the formulation of a new tenure policy at the college.

The Problem

During the past five years there has been much debate about the tenure policy at York College. Two faculty ad hoc committees have met at different times to discuss the problem and make recommendations. Time and energy has been expended by the faculty, administration and board of trustees without forming a policy suitable to all of these groups. Most recently, a faculty study of the problem recommended a solution. The President of the College found this recommendation unacceptable and subsequently made a contrary recommendation to the board of trustees. The board approved the latter recommendation.

The faculty has seen one of their recommendations altered and the most recent one rejected. It has been

disconcerting for faculty to examine an issue in depth, make recommendations and then not have those recommendations accepted. Faculty morale has suffered under the present procedures and policies.

The Investigation

A faculty profile was established for the period from the 1968-1969 academic year through the fall of 1976. With the use of this profile and a faculty flow chart a mathematical model was formulated. The profile was then used to calculate parameters for the model. The model was then used to project tenure information through the 1986-1987 academic year. A discussion of the effects of change in the parameters was accomplished through the use of the model.

BACKGROUND AND SIGNIFICANCE

National Tenure Trends

The tenure system in higher education has recently been examined by several national commissions: The Carnegie Commission; Scranton Commission; the White House Commission on Youth and perhaps the best known, the Commission on Academic Tenure in Higher Education. Although tenure has long had its critics, the recent battles have been caused by

a new set of circumstances. Protesting students of the sixties complained about tenure as a protection for incompetent teachers. The current employment recession has caused graduate students, women and minorities to become apprehensive about chances for a career in a tenured-in profession. College presidents and administrators have become critical of tenure, claiming the practice prohibits flexible planning and creative administration. William R. Keast (23:20) aptly concludes: "One national trend: more tenured faculty. A second: more worry over the first trend."

Tenure. The definition and use of tenure is best defined in the AAUP Policy, Documents and Reports (2:2-4). This writing is usually refered to as the "1940 Statement on Principles on Academic Freedom and Tenure". The following arguments are generally made in defense of tenure:

1. Tenure is necessary to protect academic freedom.

2. Tenure promotes collegiality along with joint responsibility for professional and institutional standards.

3. Tenure encourages teachers to concentrate on their students and their disciplines by minimizing competetive economic incentives.

4. Tenure has an economic value to help offset the generally lower financial rewards of the teaching profession.

5. Tenure is a mechanism for providing responsible leadership and continuity in a faculty.

The following authors detail arguments for and against tenure: Alstyne (1:328-333), Brewster (5:381-383), Brown (6:112-122), Carr (8:120), Faculty Tenure: A Report and Recommendations by the Commission on Academic Tenure in Higher Education (18) and The Twelve College Faculty Appointment and Development Study (37). The Commission on Academic Tenure in Higher Education (18:23) and the Carnegie Commission (7:58) as well as several other commissions and individuals have recommended the continuation of the policy of granting tenure.

Quotas. Although tenure is an established policy there has been a recent move to recommend a system that puts a limit or quota on the proportion of faculty that can receive tenure. The Commission on Academic Tenure in Higher Education (18:50) made this recommendation:

> The Commission recommends that each institution develop policies relating to the proportion of tenured and nontenured faculty that will be compatible with the composition of its present staff, its resources and projected enrollment and its future objectives. In the commission's nearly unanimous judgement, it will probably be dangerous for most institutions if tenured faculty constitute more than one half to two thirds of the total full-time faculty during the decade ahead.

The Carnegie Commission (7:58) echoes this: "Tenure systems should be so administered in practice that the percentage of faculty members with tenure does not become excessive."

The following authors argue the pros and cons of quotas: The Carnegie Commission on Higher Education (2:58), Committee A of the American Association of University Professors (9:428-430), David D. Dill (12:467-468), Edward D. Eddy (13:410) and The Commission on Academic Tenure in Higher Education (18:49-50). The literature does suggest that quotas are going to be a factor of increasing occurrence in tenure policies.

Tenure at York College of Pennsylvania

Method. York College has been granting tenure since the early sixties. Originally the president of the college made the decision. Later a board of administrators met to decide on tenure appointments. The present system of awarding tenure was formulated in 1968 when the Academic Senate was instituted.

An individual qualified for tenure has his department chairman make a comprehensive evaluation of his performance and then forward this with the chairmans recommendation to the Dean of Academic Affairs. The dean adds his comments and

recommendations and forward the information to the Professional Standards Committee of the Academic Senate. The Faculty Manual (17:D3.2.7F) has the following description of the duties of this committee:

> This committee is established to review all request for promotion, tenure and dismissal and to make recommendations for review by the President and the Board of Trustees....The committee shall base its deliberations and recommendations for either tenure or promotion solely on the candidates' professional qualifications and contributions to their departments and the college.

As stated above the committee sends its deliberations and recommendations to the President of the College. The President adds his comments and recommendations and presents the accumulated recommendations to the Education Committee of the Board of Trustees which makes a final recommendation to the full Board of Trustees. The final decision on tenure is then made by the Board of trustees.

Policy. The following is the original statement of policy on tenure as given in the 1970 Faculty Manual (17:31):

> Tenure of appointment is defined as a permanent or continuous contract with services terminated only for adequate cause, or in the case of retirement at age sixty-five. It is designed to satisfy three goals: To insure (1) freedom of teaching, research, and extramural activities; (2) a sufficient degree of economic security, to make the teaching profession appealing to men and women of ability; and (3) retention of only the most qualified and dedicated faculty members.

> Full-time faculty members holding the rank of Assistant Professor or higher who have engaged in full time teaching on the college level for at least six years, three full years of which have been spent in continuous teaching at York College, must be considered for tenure. Notification procedures and other procedures for granting tenure shall be in accordance with the 1940 AAUP Statement on Academic Freedom and Tenure and subsequent interpretations of that statement.
>
> The award of tenure is effective September 1 of the following academic year. Tenure entitles faculty members to continuous appointment until the mandatory retirement age of sixty-five, unless the right is forfeited by serious misconduct, professional incompetence, physical or mental disability, program termination, or financial emergencies.

This policy is in accordance with the 1940 AAUP Statement on Academic Freedom and Tenure with the exception that instructors are not considered tenurable. It should be noted that the Academic Commission on Tenure in Higher Education (18:223) reported this same restriction in 33.3 percent of all institutions surveyed.

By the fall of 1973 York College had reached a 28.2 percent ratio of tenured to full-time faculty. The administration was looking into the future when President Miller (29) made the following remarks to the nontenured faculty in February 1973:

> I want to discuss a matter with you that will soon be a problem at York College, and one that can ultimately affect you. So, I have chosen this time to alert you concerning it.
>
> According to our records, 16 faculty members will come up for tenure in 1973. Five will come up in 1874.

The administration sees the need for flexibility for the College at the present time and would be unwilling to recommend to the Board of Trustees tenure for more than 50% of the faculty in each department. What happens to the other able and dedicated faculty that the College would like to retain, but can't under present policies? This is the problem.

The York College tenure policy is tied into the policies and procedures of the A.A.U.P. We have always enjoyed good relations with A.A.U.P. We have cooperated in their salary studies and they have been most helpful on two matters that we have referred to them. Their policies call for a probationary period not to exceed six years at York College, or a combination of three at York and three or four elsewhere. If the faculty member is not denied tenure when his seventh contract is written, the faculty member automatically gets it.

Operating under a quota system we are certain to have periodically, a turn-over in faculty.

I would like to see this situation avoided. I think it can be, if we re-write our FACULTY MANUAL POLICY to conserve the tenure principle but substitute term contracts for those who cannot be placed on tenure because the department quota is filled.

In the final analysis, the recommendation to change the Manual must come from the faculty. I believe the tenure principle and term contracts can live together without destroying tenure practices.

Before getting your reactions to our problem, let me say that before we adjourn this morning, I will ask you to tell me how to proceed further. If you want further study of the subject, I will refer the matter to the Professional standards Committee, with the committee augmented by several non-tenured members, because we want your voices heard. Non-tenured members will not have a vote in the Committee deliberations, if one is necessary. If you wish our tenure statement to remain as it is now, we will drop the matter.

What are your reactions and suggestions?

The faculty reacted by forming the first Ad Hoc Committee on Tenure. This committee reviewed the literature met with interested individuals and made the following recommendation to the Academic Senate in April, 1973 (30:1):

> Tenure may be granted to full-time faculty members holding the rank of Assistant Professor or higher who have engaged in full-time teaching on the college level for at least seven years, four full years of which must have been spent in continuous teaching at York College. (Although the rank of Instructor is a non-tenured position, instructors may be retained indefinitely as needed, subject to the provisions for evaluation and notification of contract non-renewal or dismissal applicable to all other faculty members.)
>
> Consideration for tenure must take place during the sixth year of full-time college teaching, or during the third year at York College, whichever is later. Notification procedures and other procedures for granting tenure shall be in accordance with the AAUP 1940 Statement on Academic Freedom and Tenure, and subsequent interpretations of that statement.
>
> Not more than two-thirds of the full-time faculty of the college shall have tenured status. The Professional Standards Committee will develop policy which will provide flexibility to allow for necessary variation of this limit among departments.

At the May, 1973 meeting of the Academic Senate (30:3) the following information was given:

> President Miller asked the Board to approve the recommendations of the faculty with the following changes:
>
> 1. The material relating to Instructors is not acceptable as written. The President will accept the stipulation that the Instructors may be retained up to a total of six(6) years with the expectation that they will be promoted to Assistant Professor

> by March 1st of their fifth year of service. If not, they will receive a terminal contract for the sixth year. The reasoning behind this point of view is that, if an Instructor in not promotable to the next higher rank, he should not be retained indefinitely by the college, except in very unusual circumstances.
>
> 2. Not more than 60 per cent of the full-time faculty in each academic department will enjoy tenure status.
>
> 3. The President of the College reserves the right to increase the percentage of faculty holding tenure in any department if it seems necessary to do so for the best interest of the College.

The faculty never formally approved or disapproved the changes recommended by the President and the subsequent approval by the Board of Trustees.

This policy was in effect until the spring of 1974 when two individual cases occurred that forced a re-evaluation. In the first instance the faculty wished to retain an instructor who had been employed for six years but was not promoted because there were no Assistant Professor positions available in the instructors department. As a result, the following policy amendment was passed by the Academic Senate and the Board of Trustees in April, 1974 (30:3):

> Instructors are not eligible for tenure. Instructors may be retained up to a total of six years, with the expectation that they must be considered for promotion to the rank of Assistant Professor during their fifth year of service and will be notified of the decision to promote or not promote by March 1 of the fifth year of service. This does not preclude being considered for promotion earlier than the fifth year. Instructors with

previous full time experience elsewhere totaling three years or more must be considered for promotion to the rank of Assistant Professor during their third year at York College of Pennsylvania.

Normally, an instructor who is not promoted to the rank of Assistant Professor will receive a terminal contract for the sixth year. However, in certain circumstances, where the institution and the individual would benefit ba a continued association, the President, upon recommendation of the Department Chairman and the Dean of Academic Affairs, may continue to employ an individual on an annual basis at the rank of Instructor beyond the sixth year, with the understanding that de facto tenure does not apply. The individual must be notified by January 31 of the intent not to renew such a contract for the subsequent academic year. At such future time as the individual and his Department Chairman consider it appropriate, the individual may be reconsidered for promotion to the rank of Assistant Professor with the understanding that he or she must also be considered for tenure at that time.

The second case concerned an assistant professor who was found tenurable but for whom there was no tenure slot available in her department. As a result, the following policy amendment was passed by the Academic Senate and the Board of Trustees in May, 1974 (30:2):

At the professorial rank when the tenure quota in a department is filled the faculty member will receive a terminal contract for the subsequent year. However, under exceptional circumstances, if the faculty member and the institution would benefit by a continued association, the President, upon recommendation of the Department Chairman and the Dean of Academic Affairs, may offer the faculty member a contract for more than one year. There are certain contitions: (1) de facto tenure does not apply. (2) when an opening in the tenure ranks in the department occurs the faculty member, in conjunction with his department chairman, may be reconsidered for tenure. If reconsidered and not granted

tenure a terminal contract will be issued. (3) the faculty member will be informed one year in advance of the intent not to renew the contract. (4) promotion in rank may be considered during this period of time.

In the fall of 1975 the local chapter of the American Association of University Professors requested and the Academic Senate approved the formation of a second Ad Hoc Committee on Tenure. This committee again studied the problem with particular attention to the aforementioned complications of the past two years, and made the following recommendation (33:1):

> This Committee recommends that York College of Pennsylvania eliminate tenure quotas and reaffirm its commitment to the AAUP 1940 Statement of Principles on Academic Freedom and Tenure and subsequent interpretations.

The President of the College openly opposed the faculty recommendation and made the following contrary recommendation to the Education Committee of the Board of Trustees (17:1-2):

> The President of the College recommends that tenure quotas should not be abolished for the following reasons:
>
> 1. In practice, it has not been demonstrated to the President that tenure with quotas and rolling contracts is not a fair or equitable system.
>
> 2. It has not been proven to the President that the quota system and rolling contracts at York College are not working.
>
> 3. The evaluation system for faculty members being considered for tenure is new. It has not been in operation long enough to place major confidence in its

workings or in its effectiveness. The President has reason to believe that the Department Chairmen and the Dean of Academic Affairs are not as deeply involved in faculty evaluation for tenure matters as they should be.

4. The evaluation system must do more to evaluate publishing and the professional development of faculty and other scholarly pursuits as criteria for tenure.

As a result of favorable action by the Education Committee of the Board of Trustees, the President recommended to the full Board the following Faculty Manual wording which was approved at the May meeting of that body (17:2):

> At the professorial rank, when the tenure quota in a department is filled, the faculty member will receive a terminal contract for the subsequent year. However, if the faculty member and the institution would benefit by continued association, the President, upon the recommendation of the Department Chairman and the Dean of Academic Affairs, may offer the faculty member a rolling contract.
>
> A 'rolling contract' is a three-year agreement between the faculty member and the College for those faculty members who have qualified for tenure, but for whom no vacancies exist. Under this system, after each year of successful work at the College, and if there are no enrollment problems, the faculty member automatically has another three-year contract. When a tenured position arises, the Department Chairman and the Dean of Academic Affairs will recommend to the President of the College a faculty member to fill the vacancy.
>
> There are certain conditions under the 'rolling contracts' arrangement, such as: (1) De facto tenure does not apply. (2) The faculty member will be informed, two years in advance, of the intent not to renew the contract. (3) Promotion in rank may be considered

during the time the member is on the 'rolling contract' basis, the same as if he/she occupied a tenured position.

The only action that the faculty has taken since the Board decission is to ask the second Ad Hoc Committee on Tenure to remain active. That committee is currently trying to formulate a recommendation for consideration by the Academic Senate.

PROCEDURES

Collection of Background Information

The Second Ad Hoc Committee on Tenure constructed a faculty profile for the period of 1969-70 through 1974-75. This data was extended to include the 1968-69 academic year through the fall of 1976. The data was verified and corrected by the use of faculty records and interviews with several faculty and administrators who have been with the institution since the early fifties. The results of this data search are summarized in Table 1 on page 15.

Column I of this table contains the academic year. Column II contains the maximum full-time faculty employed during that year. Column III contains the percent of full-time faculty growth from one year to the next. Columns IV and V contain the number of faculty attritions and the percent of faculty attritions from tenure from one year to

Table 1

Tenure Profile

I	II	III	IV	V	VI	VII	VIII	IX
			Tenure Attrition		Gains to Tenure		Tenured Faculty	
Academic Year	Full-Time Faculty	Growth Percent	Number	Percent	Number	Percent	Number	Percent
1968-1969	57						12	21.1
		8.8	3	5.3	5	8.8		
1969-1970	62						14	22.6
		8.1	0	0.0	2	3.2		
1970-1971	67						16	23.9
		13.4	1	1.5	0	0.0		
1971-1972	76						15	19.7
		1.3	2	2.6	5	6.6		
1972-1973	77						18	23.4
		1.3	3	3.9	7	9.1		
1973-1974	78						22	28.2
		-2.6	1	1.3	13	16.7		
1974-1975	76						34	44.7
		2.6	2	2.6	7	9.2		
1975-1976	78						39	50.0
		5.1	2	2.6	6	7.7		
1976-1977	82						43	52.4

the next. Columns VI and VII contain the number of faculty hired and promoted to tenure and the percent of the faculty hired and promoted to tenure from one year to the next. This number includes those who have been found tenurable but because of quotas have been given term contracts instead of tenure. Columns VIII and IX contain the number of faculty on tenure and the percent of the faculty on tenure for the particular academic year.

Formulation of the Model

Several authors, LaSalle (25), McDonald (28) and West (39) have looked at models from a financial view. These articles discuss implications for the health of an institution which are of great interest. Other authors. Bowker (4), Dill (12), Eddy (13), Keneny (24) and Luecke (26) approach the model from the view of acheiving certain tenure percentages. Although these ideas are not entirely separable, the later one is the concern of this paper.

The granting of tenure as with the practices of rank promotion, pay scales, etc. can be thought of as a problem in staff planning. Business and industry have long used models to routinely approach such problems. David Luecke (26:274) discusses his use of a model as follows:

> The model should identify patterns of relevant events that brought about certain outcomes in past periods. Armed with such insights, the analyst can calculate alternative patterns that will bring about a desirable result in the future. He can isolate the controllable from the uncontrollable and highlight the kinds of decisions that will be most advantageous. The focus on probabilities substitutes targets and guidelines for rigid quotas. It provides an odds-maker's map that helps decision-makers tolerate some ambiguity and keeps the untenured traveler from the despair of the lost.

The profile that was developed and listed on Table 1 can be analyzed to yield information about the tenure ratio. The method for doing this is described by E. EDDY (13:406):

> An analytical faculty profile allows one to concentrate on the variables and assumptions that yield the tenure ratio. An analytical profile is, of course, similar to a quota in some respects. It, too, should project results that an institution can live with fiscally and programatically. But it displays those results directly in terms of the policies of which they are the consequences. And it sets forth its projections as options and goals, not as rigid single-factor results. It allows one to 'manipulate' variables in an artful fashion, choosing among alternatives, trading among options.

Keeping the above facts in mind we can theorize the model. If we let t(n+1) be the number of people on tenure during the next year and ftf(n+1) be the number of full-time faculty during the next year, T(n+1) the percent of full-time faculty on tenure, can be calculated as

$$T(n+1) = \frac{t(n+1)}{ftf(n+1)} \quad . \qquad (1)$$

If t(n) is the number of faculty on tenure during the current year and p(n) is the number of faculty promoted to tenure or newly hired with tenure and r(n) is the number of retiring, resigning and deaths of faculty who hold tenure, then t(n+1) can be calculated as

$$t(n+1) = y(n) + p(n) - r(n) . \qquad (2)$$

Allowing g(n) to be the number of new faculty positions for the year n+1 permits us to calculate

$$ftf(n+1) = ftf(n) + g(n) \qquad (3)$$

where ftf(n) is the number of full-time faculty during the current year.

We can now substitute equations (2) and (3) into equation (1) to produce

$$T(n+1) = \frac{t(n) + p(n) - r(n)}{ftf(n) + g(n)} . \qquad (4)$$

The right-hand side of equation (4) contains absolute numbers of faculty. It is more convenient to consider these variables in terms of percentages of full-time faculty. Thus we divide both the numerator and denominator of the right-hand side of equation (4) by ftf(n) to give us the following equation (5) in terms of percentages

$$T(n+1) = \frac{T(n) + P(n) - R(n)}{1 + G(n)} . \qquad (5)$$

One final simplification can be made. The term p(n) - r(n) can be considered as n(n), the net change of the number of faculty on tenure. The percent of the net change, N(n), can be calculated as

$$N(n) = P(n) - R(n) . \qquad (6)$$

Equation (5) can then be rewritten as

$$T(n + 1) = \frac{T(n) + N(n)}{1 + G(n)} . \qquad (7)$$

Formula (7) is a simple recursive formula. If the parameters N(n) and G(n) are known or projected for a period of time and if a current percentage of tenure T(n) is known then T(n + 1) can be calculated. Succeeding values of T(n + 1) can be calculated using the preceding value of T(n).

The above discussion can be illustrated by the use of a faculty flow chart as in Figure 1 on page 20.

Limitations and Assumptions

The basic limitation was that only a nine year period was available from which to construct the faculty profile. It should also be pointed out that the change from a junior college to a four-year institution in 1968 undoubtedly effected the tenure policy.

The following assumptions support the study: (1) The future would be a reflection of the past. Should this assump-

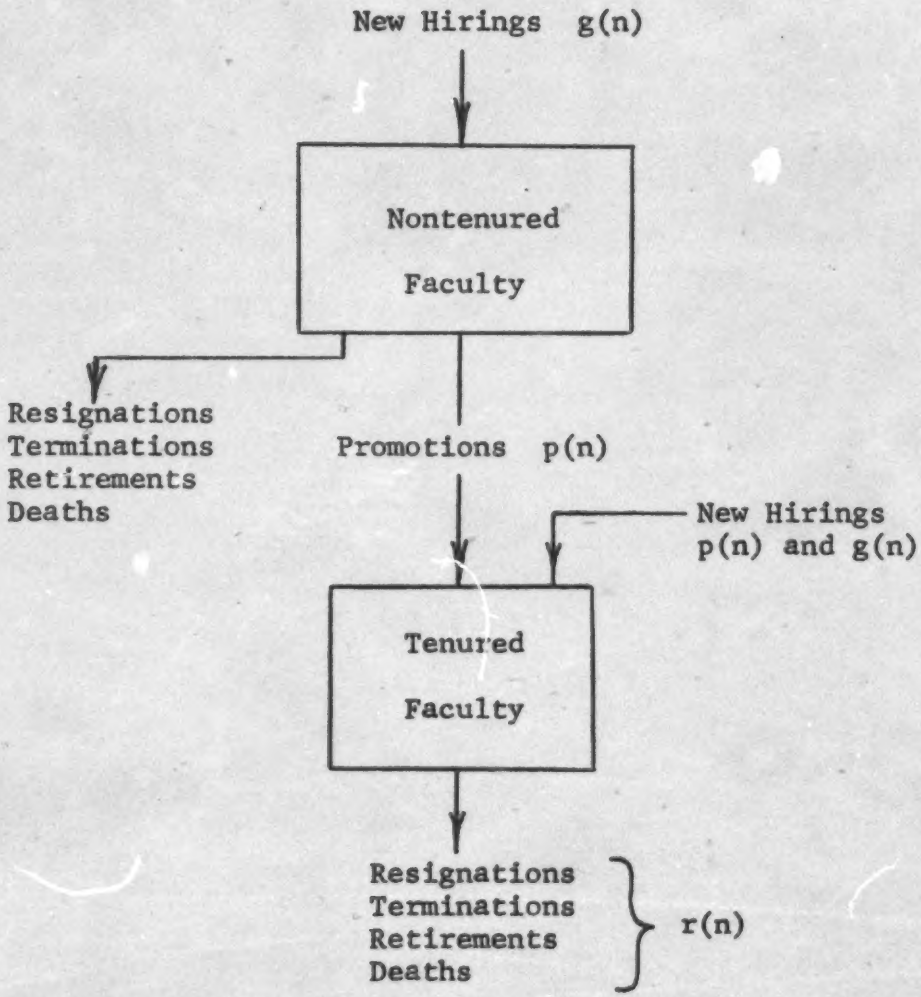


Figure 1

Faculty Tenure
Flow Chart

tion be false, different strategies have been employed to handle changing situations. (2) The above limitations would not adversly effect the overall results. (3) The faculty profile was accurate.

RESULTS

Using the data in Table 1 the parameters to be used in the model were calculated. During the period 1968-69 through the fall of 1976 the average percentage of promotions to tenure as 7.65%, the average percentage of resignations from tenure was 2.47% and the percentage of growth was 4.76%. Table 2 list the values of the parameters.

Table 2

Model Parameters
1968-1976 Basis

P(n)	R(n)	N(n)	G(n)
.0765	.0247	.0518	.0476

These parameters can be used in the model to project the tenure percentages through 1987, starting with the initial tenure ratio of T(n) = 0.5244, which is the actual value for the Fall of 1976. The results of this projection are summarizes in Table 3 which follows.

Table 3

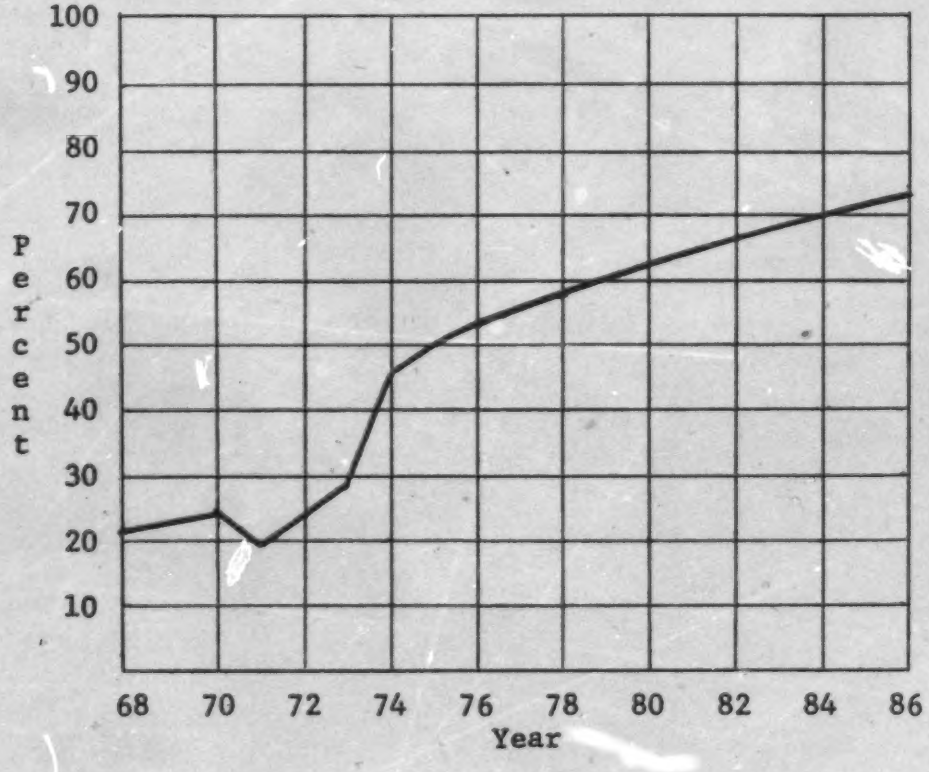
Projected Tenure Percentages

Academic Year	1976 1977	1977 1978	1978 1979	1979 1980	1980 1981	1981 1982	1982 1983	1983 1984	1984 1985	1985 1986	1986 1987
Tenure Percent	52.4	55.0	57.4	59.8	62.0	64.1	66.2	68.1	70.0	71.7	73.4

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

The tenure data on Tables 1 and 3 have been graphed in Figure 2 which follows.

Figure 2



Tenure Percentages
at
York College of Pennsylvania

As is shown, the percent of tenured faculty rose sharply since 1971. Indeed if we were to use the past five years as the basis for our model the tenure percentages would be much higher.

The model parameters have been calculated for the preceding five years and appear in Table 4 which follows.

Table 4

Model Parameters
1971-1976 Basis

P(n)	R(n)	N(n)	G(n)
.0985	.0260	.0725	.0156

Using these parameters in the model will yield a second projection of the tenure picture at York College. This projection is contained in the following Table.

Table 5

Projected Tenure Percentages

Academic Year	1976 1977	1977 1978	1978 1979	1979 1980	1980 1981	1981 1982	1982 1983	1983 1984	1984 1985	1985 1986	1986 1987
Tenure Percent	52.4	58.8	65.0	71.1	77.2	83.1	89.0	94.8	100	100	100

While the first projection shows that the tenure in ten years will be less that 75 percent the second projection shows that tenure will reach 100 percent in just eight years.

For an administration that holds the line at 60 percent tenured faculty neither of these projections will be reassuring.

The model has been used previously to project the future situation at the college. It has confirmed the administrations contention that the college will soon reach and surpass their recommendation of 60 percent on tenure. Perhaps the question of how the tenure percent can be controlled is as important as the question of the final tenure percent. The model can also be used to develop a strategy for controling the tenure percentage.

Effects of G(n)

The growth of a faculty provides opportunity to balance the tenure ratio. Committee Z of the American Association of University Professors (10:198-202) in 1973 presented an interesting model. Assuming a faculty of 300 with 66 percent of the faculty holding tenure, a growth rate of five percent, losing ten percent of tenured faculty each year through resignations, retirement, etc., tenuring 66 percent of its probationary faculty, and filling one-half of the tenured vacancies and no new positions with tenured faculty, it was found that the tenure ratio will remain a

constant 66 percent. Without the five percent growth rate the tenure ratio rose rapidly to 80 percent.

The growth factor is very critical in the tenure model. The following graph contains the cases when N(n) = 0, and the growth rate varies from negative 5 percent to positive 20 percent, with an initial tenure percent of 50.

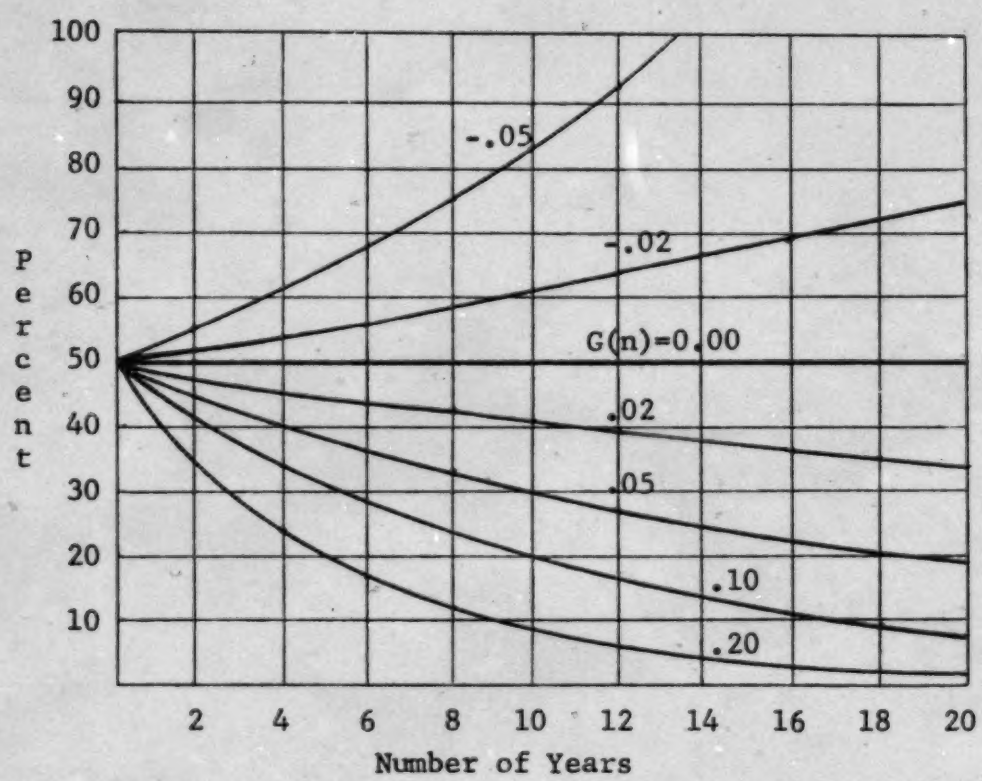


Figure 3

Tenure Percent
N(n) = 0

Figure 4, which follows, contains cases when N(n) is ten percent and the growth rate varies from 0 percent to

positive 30 percent, and an initial tenure percent of 50.

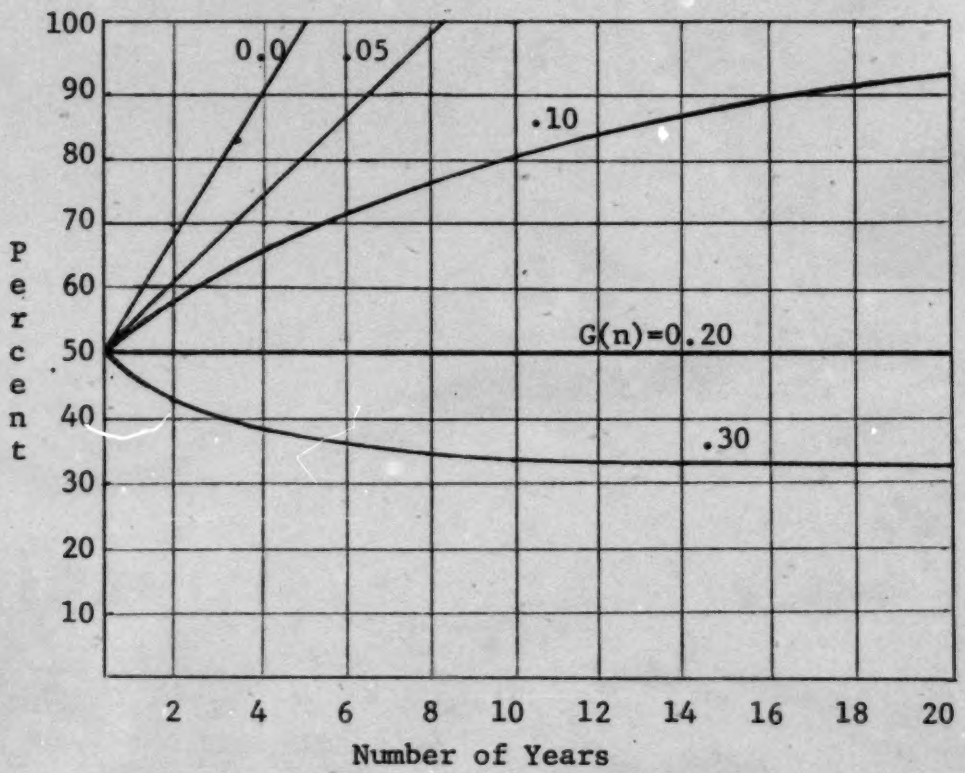


Figure 4

Tenure Percent
N(n) = 0.1

Even though the growth in faculty is an important factor it is very difficult to control. The growth at York College should remain about five percent per year over the next several years due to the following facts. In January 1977 the college is adding a Masters Degree program in Business Administration and in the fall of 1977 the college

will be starting a baccalaureate program in nursing. In addition the enrollment has been increasing about four percent per year during the past several years.

Effects of N(n)

As can be seen from Figures 3 and 4 the net growth of tenured faculty has a critical effect on the tenure percentage. The following graph on page 28, Figure 5, contains examples for G(n) = 0 percent and the net change in tenure varying from negative five percent to positive five percent and with an initial tenure ratio of 50 percent.

The graph on page 29, Figure 6, containes cases for G(n) equal to ten percent and the net change in tenure varying from negative five percent to positive ten percent with an initial tenure ratio of 50 percent.

The percent of the net change in tenure was given in equation (6) as $N(n) = P(n) - R(n)$. Each of these parameters are considered in turn.

The promotion rate is perhaps the most controlable of these parameters. The promotion rate is effected by the growth of the faculty, the length of the probationary period and the severity of the review for a tenure promotion.

The retirement, resignation and death rates are somewhat more difficult to control. The retirement rate can be increased through policy changes in a e requirements and incentives for early retirement.

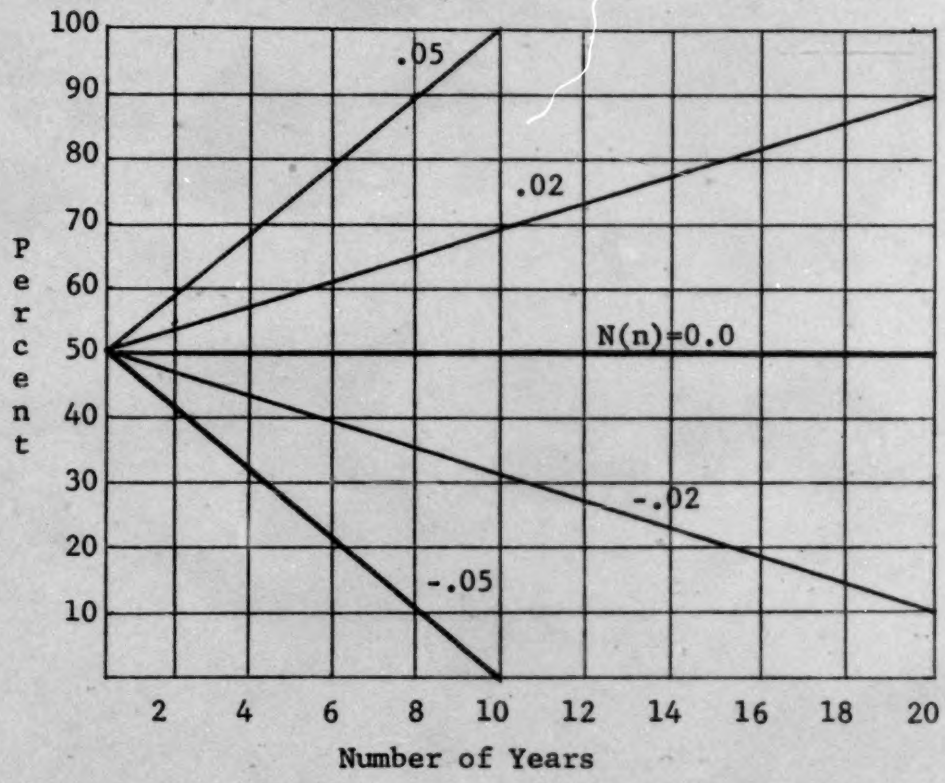


Figure 5

Tenure Percent
G(n) = 0

Maintaining a Ratio

Once a desired ratio is established the model, equation (7), can be used to show the restriction on the parameters that are necessary if that ratio is to be maintained. If T(n) is our desired ratio, then T(n+1) = T(n).

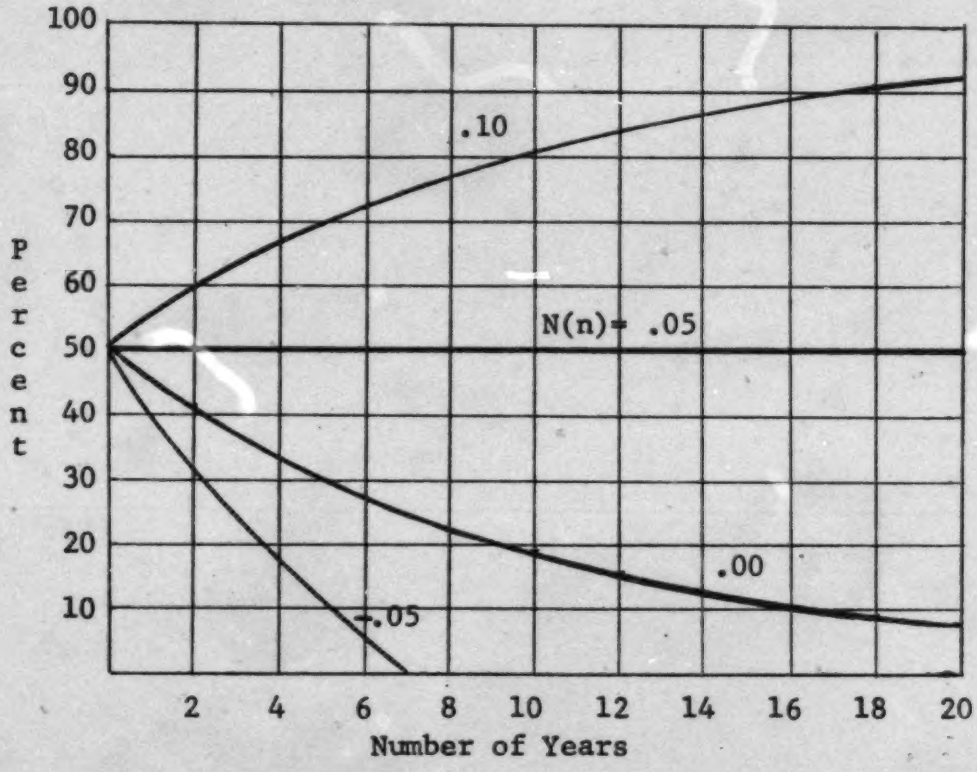


Figure 6

Tenure Percent
G(n) = 0.1

Using equation (7) this yields

$$T(n) = \frac{T(n) + N(n)}{1 + G(n)}$$

or

$$T(n) \cdot G(n) = N(n) \ . \qquad (8)$$

Suppose a policy was designed to limit the tenure percent at 60. A future growth of five percent is projected. The formula (8) yields a net change in tenure of three percent. That is if we wish to maintain a 60 percent tenure ratio and we have a five percent growth rate we will have to have a policy that allows for a net change of tenured positions of three percent. If we are in a steady-state of growth at 0 percent then the net change in tenured faculty must also be 0 percent. Indeed the ratio of those on tenure must be the same as that between the percent of net change in tenure to the percent of growth.

Recommendations

Staff Planning. Several of the commissions that studied tenure commented on the need for effective staff planning. The Commission on Academic Tenure in Higher Education (18:45) made the following statement:

> Staff planning is a seriously neglected element of college and university personnel policy. Many problems attributed to the tenure system are in fact the results of poor staff planning. By staff planning

> we refer simply to the projection, on a departmental and institution-wide basis, of the staff requirements of the institution for a future period, say five to ten years, on the basis of what is known or can be realistically estimated about enrollment, budget, and other resources; program changes; and availability of personnel - all assessed in relation to the goals of the institution as a whole.

The overall concern for staff planning and the need for an analytical faculty profile is given by Edward Eddy (13:401):

> All that is needed is a much closer look at the more specific factors and alternatives in a college or university's total system of faculty appointment. A whole series of events and transactions, sometimes fairly complex, underlies the procedures and policies which habitually we take for granted. The interactions in and among appointment, renewal, tenure, rank, termination, age, retirement, and cost are open to analysis and are a proper object to study. In approaching the question in this way one quickly becomes aware that the ratio of tenured to non-tenured faculty is merely one expression of a series of underlying processes, events, and policies.

Although these authors point to the need for staff-planning in developing tenure policies they also state the need in terms of other policy and the overall health of the faculty.

Recommendation 1. <u>The Department Chairmen and the Dean of Academic Affairs should develop a comprehensive faculty profile</u>.

This faculty profile should include:

1. Size of the faculty, full-time, part-time and full-time equivalents.
2. Age, years of service and rank of the faculty.
3. Female and minority totals.
4. Number of faculty on tenure, number of faculty promoted to tenure and attrition of all faculty.
5. Financial information on salaries and fringe benefits.

Recommendation 2. The faculty profile should be analyzed and used to determine administrative policy and practice.

The study of the faculty profile as well as the knowledge of what has happened in the past should make those in decision-making positions more aware. The analysis of this data should be used in several areas:

1. To ensure that junior positions become available at regular intervals.
2. To ensure that the faculty has a reasonable age spread.
3. To ensure recruitment of women and minority groups.
4. To ensure that the institution has the flexibility to meet its existing goals, expand existing programs and explore new endeavors.

New Positions. The effectiveness of any personnel policy depends largely on the care taken in making initial appointments. With the current surplus of college teachers a college should be able to take measures to ensure a complete review of all qualified candidates.

Recommendation 3. The college should develop a policy to ensure the most careful review of prospective faculty prior to the initial appointment.

To lessen the chances of high tenure ratios new appointments should be made on probationary status. This of course is also a cost saving practice. Committee Z (10:201) shows that for a fixed 50 percent tenured faculty the following must occur:

Table 6

Nontenured Replacements Verses Annual Promotion to Tenure

Rate of Nontenured Replacements	Annual Promotion to Tenure Rate
1.00	0.05
.75	0.0375
.50	0.025
.25	0.0125
.00	0.00

To improve morale of nontenured faculty the annual promotion rate to tenure should be as high as possible.

Recommendation 4. All new appointments should be made without tenure.

Probationary Period. The maximum probationary period permitted under the guidelines of the American Association of University Professors is seven years. York College adheres to this guideline with the exception that professors with three or more years of experience before coming to the college have a probationary period of four years. In order to evaluate an individual's teaching effectiveness, research ability and scholarship seven years appears sufficient.

A faculty member with experience is considered for tenure in the spring of his third year at the college. This period is not sufficient to evaluate a faculty member who must adjust to a new college.

Recommendation 5. The probationary period should be seven years for all new appointments regardless of previous experience.

The result of the preceding recommendation will be to decrease the ratio of faculty promoted to tenure and thus decrease the tenure ratio.

Tenure Evaluation. If tenure is automatic it loses much of its effectiveness. The decision to grant tenure should be based on sound criteria. It should occur after continuous evaluation and consel and include adequate consideration of all relevant factors.

Recommendation 6. Promotion to tenure should occur only after the most careful and complete review.

Robert Carr (8:125) states:

> First, colleges and universities can be more conservative about tenure appointments; there is nothing in the tenure system which requires that every teacher be given tenure at the end of this probationary period. Faculties are free to set high standards for tenure appointments and to enforce these standards rigorously.

It is not the wish of this author to suggest that a college should institute standards that are unreasonable as a means of minimizing a tenure ratio. If tenure is to be meaningful its achievement must be significant.

Retirement. Edward Eddy (13:411) points out that the average attrition rate of tenured faculty due to retirement is about three percent per year. It is apparent that the changing of retirement policies will have only a minimal effect on tenure ratios.

There have been two recent changes in retirement policies. The first is the reduction of the mandatory age

for retirement. York College reduced its requirements in the early seventies to the age of sixty-five. Because of declining birth rates and other social factors it seems inadvisable to recommend a lower retirement age.

The second area is optional early retirements. An early retirement policy that has advantages outweighing its disadvantages should be attractive to faculty. Coolidge (11) and Hopkins (21) have done research in this area. The idea of early retirement should not have the negative image it now has. Robert Carr (8:126) points out:

> Many faculty members would welcome some alternative to the usual drift toward retirement....Many need a change of role, perhaps within the university where they have tenure, but often outside the institution.

Recommendation 7. A policy of attractive early retirements at York College should be examined.

Conclusion. One can not refute the statistics. Elain El-Khawas (14:5) points out that the percent on faculty on tenure in the United States rose from 43 percent in 1972 to 59 percent in 1974. Committee Z of the American Association of University Professors reports (10:204) that the percentage is 60 in 1976. This is an increase of seventeen percent in just four years. Indeed the model used in this paper has shown that the tenure percentage will raise very

sharply at York College.

The intent of this paper is reflected in the words of David Luecke (26:283):

> The thrust of this article is that tenure can be rationed without reverting to quotas. The alternative to quotas can be summarized in the concept of targets which are implicit in the guidelines discussed. Besides just something different, the two are substantively distinct....Targets and quotas are related in that they are both efforts to exert control over future events. Quotas would seem, however, to make tenure decisions directly dependent on tenure departures as they occur, particularly if the quotas are of the one-in-for-one-out sort. Under these circumstances little control is left in the hands of either the decision-makers or the promotion-seekers. Promotion practices could then appropriately be called arbitrary.

It is also important to note that the previous recommendations are suggestions for policy change and study and analysis of the situation. Edward Eddy (13:415) uses this as a basis for making the following argument against quotas:

> The foregoing analyses suggest that the fear that surrounds a faculty's becoming fully tenured needs to be tested against the quantitative and policy factors at work in an institution's appointment system. It is often the case that the upward pressures on tenure do reach a manageable limit, and then hold at that level. In a steady-state context, as the number on tenure rises, the number not tenured declines. This means in turn that there are more opportunities for retirements, resignations and so forth among those tenured, and fewer non-tenured individuals to promote. All institutions would be well served by a careful study of where their tenure equilibrium points are or could be. This process of study and analysis should lead to a

carefully constructed analytical faculty profile which will obviate the necessity of tenure quotas.

The argument against quotas is eloquently stated by Committee Z (10:203) of the American Association of University Professors:

> Finally, we observe that the tenure ratio is itself a choice variable. The tendency of tenure proportions to increase does not portend reaching a wholly tenured faculty, despite occasional rhetoric that suggests the reverse. The cost of a slightly higher tenure ratio is best measured by the cost necessary to avoid the increase. The tenure ratio itself along with the variables we have identified needs to be selected with regard to the overall quality of the education provided, and the objectives of the institution. Instead of setting tenure quotas and suddenly stopping promotions when the quota is reached, the institution should pick a set of policies that is compatible with an acceptable tenure ratio. We see two dangers; one is that such decisions will be made without appreciating the trade-offs involved, and second that they will be made by administrations without the full participation of faculty in the decisions. We reiterate the fundamental principle that any such plan should be developed with full participation of the faculty, both senior and junior.

Recommendation 8. <u>York College of Pennsylvania should replace its sixty percent tenure quota by department with a college-wide tenure target. Furthermore; policies and administrative practices should be developed, as previously recommended, that will provide for achievement of this target</u>.

Potential for Improvement

Internal Relations. During the past four years the college has spent much time and effort examining the tenure situation. The projections form the model have shown that there is a real concern, if not currently, at least in the immediate future.

The faculty has twice rejected departmental quotas. The quota system has caused the faculty who do not hold tenure to look with suspicion upon those who do. It has caused a rivalry between fully tenured departments and those not fully tenured. Faculty morale has suffered under the present policies and procedures at the college.

The faculty has twice made recommendations and had them either altered or completely rejected by the administration. This has been a source of friction between faculty and administration. Each of these groups is proposing what it thinks is best for the college and feels the other group has ulterior motives. The Board of Trustees is concerned over the negative effect this situation has had on the college. Any attempt to solve the problem should be welcomed.

Policy. Although this paper was written in an attempt to improve the tenure policy of the college it has a much broader effect. The main recommendations encourage

staff development and creative staff planning. The recommendations should have an effect on promotion, salary, hiring, retention and retirement policies. The current tenure policy has been changed yearly to suit the needs of the particular time. It seems realistic to expect a more stable tenure policy than currently exists. If this paper helps in the development of a policy that is acceptable to both faculty and administration it will be a major improvement.

BIBLIOGRAPHY

1. Alstyne, William Van. "Tenure: A Summary Explanation and 'Defense'," AAUP Bulletin, Autumn 1971, 328-333.

2. AAUP Policy, Documents and Reports. Washington, D.C.: The American Association of University Professors, 1971.

3. Blackwell, Thomas E. College and University Administration. New York: The Center for Applied Research in Education, Inc., 1966.

4. Bowker, Albert H. "Managing the Faculty Resources in the Steady State," Formulating Policy in Postsecondary Education: The Search for Alternatives, J. F. Hughes, ed. Washington, D.C.: American Council on Education, 1975.

5. Brewster, Kingman Jr. "On Tenure," AAUP Bulletin, Winter 1972, 381-383.

6. Brown, J. Douglas. The Liberal University: An Institutional Analysis. New York: McGraw-Hill Book Company, 1969.

7. The Carnegie Commission on Higher Education. Governance of Higher Education: Six Priority Problems. New York: McGraw-Hill Book Company, 1973.

8. Carr, Robert K. "The Uneasy Future of Academic Tenure," Educational Record, Spring 1972, 120-126.

9. Committee A. "On the Imposition of Tenure Quotas," AAUP Bulletin, Winter, 1973, 428-430.

10. Committee Z. "Surviving the Seventies: Report on the Economic Status of the Profession," AAUP Bulletin, Summer 1973, 198-203 and Summer 1976, 195-212.

11. Coolidge, Herbert E. and Alton L. Taylor. Considerations for Faculty Retirement Policies in a Steady-State Condition: A Report to the Provost, University of Virginia, June 1973.

12. Dill, David D. "Tenure Quotas: Their Impact and an Alternative," Liberal Education, December 1974, 467-477.

13. Eddy, Edward D. and Richard L. Morril. "Living with Tenure Without Quotas," Liberal Education, October, 1975, 399-417.

14. El-Khawas, Elaine H. and W. Todd Furness. "Faculty Tenure and Contract Systems: 1972 and 1974," Higher Education Panel Reports, Number 22. Washington, D.C.: The American Council on Education, 1974.

15. Enteman, Willard F. "Tenure at Union College," Liberal Education, December, 1974, 461-466.

16. Faculty Career Planning Report: From the Board of Deans, University of Washington. Washington University, 1973.

17. Faculty Manual of York College of Pennsylvania and subsequent revisions. York College of Pennsylvania, 1970 to date.

18. Faculty Tenure: A Report and Recommendations by the Commission on Academic Tenure in Higher Education, William R. Keast, Chairman. San Francisco: Josey-Bass, Inc., 1973.

19. Furness, W. Todd. Steady-State Staffing in Tenure-Granting Institutions, and Related Papers. Washington, D.C.: The American Council on Education, 1973.

20. _____. "Steady-State Staffing: Issues for 1974," Educational Record, Spring 1974, 87-95.

21. Hopkins, David S.P. Recommendations. California Academic Planning Office, Stanford University, July 1972.

22. Keast, William R. "The Commission on Academic Tenure in Higher Education:A Preview of the Report, " Liberal Education, May 1973, 194-201.

23. Keast, William R. "Facing the Tenure Problem," Association of Governing Boards Reports, November/December, 1974, 20-24.

24. Kemeny, John G. "What Every College President Should Know About Mathematics," American Mathematical Monthly, October, 1972, 889-901.

25. LaSalle, Joseph P. "Appointments, Promotions and Tenure Under Steady-State Staffing," American Mathematical Society Notices, January 1972, 69-73.

26. Luecke, David S. "An Alternative to Quotas: A Model for Controlling Tenure Proportions," Journal of Higher Education, April, 1974, 273-284.

27. Malpass, Leslie F. "Dividing Up the Tenure Pie," College and University Business, August 1974, 33-35.

28. McDonald, John G. "Faculty Tenure as a Put Option: An Economic Interpretation," Social Science Quarterly, Fall, 1974, 362-371.

29. Miller, Ray A. "Remarks made to the Non-Tenured Faculty of York College," February, 1973.

30. Minutes of the Academic Senate of York College, April 17, 1973; May 10, 1973; April 14, 1973; April 1, 1974; and May 7, 1974.

31. Moog, F. "Alternative to Tenure," Cronical of Higher Education, April 10, 1972.

32. Nesbet, Robert A. "The Permanent Professors: A Modest Proposal," Public Interest, Fall, 1965, 35-50.

33. Report of the Ad Hoc Committee on Tenure, York College of Pennsylvania, February, 1976.

34. Shulman, Carol Herrnstadt. "The Tenure Debate," ERIC Clearinghouse on Higher Education, Washington, D.C., 1971.

35. The Tenure Debate, ed. Bardwell L. Smith. San Francisco: Josey-Bass Inc., Publishers, 1973.

36. Tenure and Promotion Study, William Rainey Harper College, Palatine, Illinois, June 1973.

37. The Twelve College Faculty Appointment and Development Study. The Institute for Educational Development, New York, January, 1973.

38. "The York College Academic Senate Ad Hoc Committee on Tenure and Rolling Contracts: Final Report and Recommendations," York College of Pennsylvania, 1976.

39. West, Richard R. "Tenure Quotas and Financial Flexibility in Colleges and Universities," Educational Record, Spring 1974, 96-100.

40. Wilson, Charles F. "The Case for and Against Tenure," Paper presented to the annual meeting of the American Association of School Administrators, Dallas, Texas, February, 1975.